

*What is claimed is:*

*Sub A*  
1 1. A method for characterizing ingress events in a network environment having return  
path communications being accomplished in a plurality of frequency bands, the method  
3 comprising the steps of:

4 (a) detecting one or more ingress events in the return path over a pre-determined  
5 time period;  
6 (b) marking the frequency band wherein each ingress event exceeds a pre-  
7 determined threshold;  
8 (c) marking each time interval in which the ingress events exceeds a pre-  
9 determined threshold; and  
10 (d) creating a time/frequency map of the ingress events, wherein the time/frequency  
11 map contains the results of steps (b) and (c).

1 2. The method of claim 1 wherein the time/frequency map is characterized by marking  
2 each ingress event that exceeds the pre-determined threshold with a "1".

1 3. The method of claim 1, further comprising the step of:

2 (e) evaluating the time/frequency map, and  
3 (f) mitigating the return path ingress, based on the evaluation of the time/frequency  
4 map.

1 4. The method of claim 3 wherein step (f) is accomplished by attenuating the return path  
2 signal.

1 5. The method of claim 4 wherein the attenuation is performed based on a power-level  
2 equalization algorithm.

1 6. The method described in claim 3 wherein step (f) is accomplished by isolating the return  
2 path signal.

1 7. The method of claim 1, further comprising the steps of:

2 (e) summing the results of the marking process of step (c) across a plurality of  
3 frequency bands within a specific time interval.

1 8. The method of claim 7, further comprising the steps of:

2 (f) labeling the ingress event as a wideband ingress event if the sum obtained in  
3 step (e) exceeds a pre-determined wideband ingress threshold.

1 9. The method of claim 7, further comprising the steps of:

2 (f) labeling the ingress event as a narrowband ingress if the sum obtained in step  
3 (e) is below a pre-determined narrowband threshold.

1 10. The method of claim 1, further comprising the steps of:

2 (e) summing the results of marking process of step (c) across a plurality of time  
3 intervals within a specific frequency band.

1 11. The method of claim 10, further comprising the step of:

2 (f) labeling the ingress event as a narrowband ingress event when the sum obtained  
3 in step (e) exceeds a pre-determined narrowband ingress threshold.

1 12. The method of claim 10, further comprising the step of:

2 (f) labeling the ingress event as wideband ingress when the sum obtained in step  
3 (e) exceeds a pre-determined wideband ingress threshold.

1 13. The method of claim 1 wherein the step (a) occurs at the head-end.

1 14. The method of claim 1 wherein the step (a) occurs substantially near the subscriber  
2 location.

1 15. The method of claim 1 wherein the step (a) occurs at a test point in the network.

1 16. The method of claim 1 wherein the step (a) occurs at a head-end of the network.

1        17. The method of claim 1 wherein the step (a) utilizes ingress measurements extending  
2 across the return frequency band.

1        18. The method of claim 1 wherein the step (a) takes place in a sub-band of the return  
2 frequency band.

1        19. The method of claim 1 wherein the step (a) takes place in an active sub-band of the  
2 return frequency band.

1        20. The method of claim 1 wherein the step (a) takes place in an inactive sub-band of the  
2 return frequency band.

1        21. The method of claim 1 wherein the step (a) comprises the steps of:

- 2        (1) measuring an average return path signal power in the return frequency  
3            band;
- 4        (2) comparing the average return path signal power to a detection threshold; and
- 5        (3) determining the presence of an ingress event in the return frequency band based  
6            on the result of the comparison.

1        22. The method of claim 1 wherein step (a) comprises the steps of:

- 2        (1) retrieving information on channel usage to distinguish active sub-bands from  
3            inactive sub-bands; and
- 4        (2) detecting the presence of ingress in the inactive sub-bands of the return path.

1        23. The method of claim 22 wherein the information on channel usage is retrieved from  
2 the head-end.

1        24. The method of claim 22 wherein channel usage is detected automatically at a location  
2 substantially near the subscriber location.

1        25. The method of claim 1 wherein step (a) comprises the steps of:

2 (1) retrieving information on channel usage to distinguish active sub-bands from  
3 inactive sub-bands; and  
4 (2) detecting the presence of ingress in the active sub-bands of the return path.

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1 26. The method of claim 25 wherein the information on the channel usage is retrieved  
2 from the head-end.

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2 27. The method of claim 25 wherein the channel usage is detected automatically at a  
location substantially near the subscriber location.

1 28. The method of claim 27 wherein the automated detection of channel usage comprises  
2 the steps of:  
3 (1) estimating a power spectrum density (PSD) of a return path signal;  
4 (2) correlating the PSD with a set of stored PSDs;  
5 (3) determining a frequency at peak correlation; and  
6 (4) creating a frequency band in use.

1 29. The method described in claim 25 wherein the active band is in use by an in-home  
2 device.

1 30. The method described in claim 25 wherein the active band is in use by a  
2 communications gateway.